

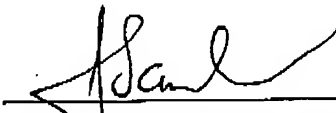
REMARKS

The rejections under Section 112 have been obviated. The replacement sheet for figure 5 has been included and no new matter has been added. Applicant believes that his application is now in allowable form and requests an early favorable action.

Respectfully submitted,

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V. DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENT

Referring now to the drawings, where the present invention is generally referred to with numeral 10, it can be observed that it basically includes temperature sensor-coupling unit 20, panel support bracket 40, and display panel assembly 60.

As shown in figure 1, panel support bracket 40 slides onto and is snugly secured onto sensor-coupling unit 20, which is removably attached to display panel assembly 60.

As seen in figures 2 and 2a, sensor-coupling unit 20 comprises male thread 32 outwardly extruding from face 30 and terminating at edge 34, and female thread 29 intrudes within sensor-coupling unit 20 a predetermined distance from edge 28. Approximately perpendicularly extending from face 30 is cylindrically shaped face 22 that extends to ridge 24. Cone 26 tapers slightly from ridge 24 and terminates at edge 28. Extending from face 22 is connecting cable 36, which terminates at connector 38. Connector 38 plugs into a port, not seen, opposite display panel 62 of display panel assembly 60.

As seen in figure 3, panel support bracket 40 comprises base 52. Approximately perpendicularly extending from base 52 is frame 50, which secures to tapered ring 42. Tapered ring 42 has interior wall 44 and edges 46 and 48. Tapered ring 42 has cooperative characteristics to snugly fit onto cone 26.

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2 As seen in figure 4, display panel assembly 60 comprises frame 64.
3 Frame 64 has through-hole 66 to provide for means to removably secure to
4 base 52. Such means may be a screw that trespasses through-hole 66 and
5 attaches to base 52 for example. Display panel assembly 60 also has
6 display panel 62 and buttons 68.

7

8 Referring to figure 5, embedded within the sensor-coupling unit 20 is
9 a thermocouple sensor 21 in the preferred embodiment. Thermocouple
10 sensor 21 responds to temperature changes within the sensor-coupling unit
11 20. The thermocouple sensor 21 generates a thermoelectric voltage in the
12 temperature gradient that exists between a hot (junction exposed to the
13 temperature being measured) and cold junctions. A cold-junction
14 compensator 23 is used connected to input 23' to develop a compensation
15 signal on output 23'', which automatically varies with the cold junction
16 temperature in such a way to maintain the output signal constant for a
17 constant temperature measurement.

18

19 Analog-to-digital device 25 receives the linear voltage of output 23''
20 over the range of interest and processes the signal to the computer or
21 microprocessor 27 to translate to output 27' and display as the actual
22 temperature reading on the display panel 62, which in the preferred
23 embodiment is a liquid crystal display (LCD). Another embodiment for
24 display panel 62 includes microprocessor-based circuitry to connect
25 directly to device 25.

26

27 Also embedded within the sensor-coupling unit 20 is a conductivity
28 sensor 31 for detecting the presence of water within the sensor-coupling

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2 unit 20. The conductivity sensor 31 consists of metal measuring
3 electrode(s), not seen, that monitor the presence of water by one of two
4 basic methods. One measures conductivity by a fixed voltage between
5 electrodes so that the resulting current flow is directly proportional to the
6 conductivity. On the other hand, the electrodes can be supplied with a
7 current flow so that the potential between the electrodes are directly
8 proportional to the resistance of the water, which is the reciprocal of its
9 conductivity.

10
11 A main operation of microprocessor 27 is to monitor signals from the
12 thermocouple sensor 21 and conductivity sensor 31 simultaneously, in
13 order to detect actual water temperature as it discharges. When water flow
14 ceases to discharge out the showerhead 86, seen in figure 6, it also ceases to
15 be present at sensor-coupling unit 20. Therefore, by monitoring the
16 conductivity inside the sensor-coupling unit 20, instant invention 10 can
17 detect when water is no longer present at the showerhead 86.
18 Microprocessor 27 commands will then halt the displaying of temperature
19 and redirect its instructions to display a text message indicating that water
20 is no longer present. Microprocessor 27 defining part of the
21 microprocessor-based circuitry seen in figure 5, has a programmable
22 memory storage system, not seen, used for retrieving multi-user
23 temperature settings.

24
25 An additional essential feature of instant invention 10 allows users to
26 save desired shower temperature settings into memory and recall them
27 later in time with push buttons 68. The instant invention 10 can save user
28 temperatures along with unique user identification with the programmable

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2 memory storage system, within microprocessor 27, for future association
3 purposes. When a user turns on hot and cold water, an indeterminate
4 amount of time elapses until the desired water temperature arrives at the
5 showerhead 86. This waiting period can be exacerbated if extreme cold or
6 hot ambient temperatures exist in relation to the desired temperature. The
7 present invention 10 alerts users when the shower temperature has reached
8 their desired setting by producing an audible tone with buzzer 39 that can
9 be silenced by the user entering the shower. As a safety feature, a warning
10 tone alerts a user to potential scorching if the temperature has passed a
11 preprogrammed temperature setting. This allows a user to correct the
12 temperature safely before entering the shower. It is noted that the instant
13 invention is powered by a battery power source such as an electric battery,
14 ~~which is not~~ as seen in figure 5 for simplicity. The electric battery may be
15 an electric dry cell battery.

16

17 Referring to figure 6 for installation, shower assembly 80 comprises
18 wall 82. Protruding from wall 82 is shower arm 84, and removably secured
19 onto shower arm 84 is showerhead 86. Sensor-coupling unit 20 is
20 detachable from panel support bracket 40 to allow installation simplicity.
21 Sensor-coupling unit 20 attaches directly onto existing standard shower
22 arm 84 by first removing the existing showerhead 86. After existing
23 showerhead 86 is removed and placed aside, ring 42 from panel support
24 bracket 40 is slipped along shower arm 84. While the panel support bracket
25 40 hangs on the shower arm 84, the female end, at edge 28, of the sensor
26 coupling unit 20 is attached to the shower arm 84 by rotating clockwise
27 until it tightens. The panel support bracket 40 is then slid down the shower
28 arm 84 until it snugly mounts upon the sensor-coupling unit 20. Finally,

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2 display panel assembly 60 is ready for attaching to the panel support
3 bracket 40.

4
5 Sensor-coupling unit 20, panel support bracket 40, and display panel
6 assembly 60 can be maintained joined and installed in a single step;
7 although, separating the units proves to be more comfortable for
8 installation purposes. Once all the units are assembled, the terminating
9 connector 38, better seen in figure 2, from the connecting cable 36 can be
10 plugged into the port, not seen, of display panel assembly 60. At this time
11 the instant invention 10 can be switched on. Users have the ability to tilt
12 and swivel the display panel 62 at any time to the desired viewing angle.
13 The present invention's uniqueness is its straightforwardness installation
14 process.

15
16 The foregoing description conveys the best understanding of the
17 objectives and advantages of the present invention. Different embodiments
18 may be made of the inventive concept of this invention. It is to be
19 understood that all matter disclosed herein is to be interpreted merely as
20 illustrative, and not in a limiting sense.